

### **REMARKS/ARGUMENTS**

Reconsideration of this application is requested. Claims 19-36 are in the case.

#### **I. THE ANTICIPATION REJECTION**

Claims 19-23, 25, 26, 28, 30, 31, 32, 33 and 35 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Baba et al. That rejection is respectfully traversed.

In response, and without conceding to the merit of the rejections, the independent claims have been amended to specify that both refractive index and optical gain/loss of each active waveguide portion are changed by application of an electrical signal. Baba neither mentions nor suggests that the optical gain/loss characteristics of the active layer are changed by an electric field. It should be noted that the term "active waveguide" is used with differing meanings within this field of technology. Specifically, within Baba, the term "active waveguide" means an essentially transparent waveguide having a refractive index response to an external electrical signal. It is clear throughout Baba that it is the intention *only* to change the *refractive index* of the active layer, and *not* to change the gain/loss of the active layer. Indeed, this is partially why an on-off contrast of a mere  $0.8/0.2 = 5$  or about 7 dB is achieved (which is common with an optical switch relying solely on refractive index change), whereas the present invention provides an on-off contrast of at least 50dB (as reported in S. Yu et al., post-deadline paper, CLE099, May 1999, Baltimore, MA).

Thus, Applicants disagree with the Examiner's allegation (see: page 4 of the Action) that the cross-point switch of Baba implicitly discloses an inherent variation in optical gain/loss under the influence of an electrical field or current. It is well known in

the art that it is not an inherent characteristic of an active layer or active waveguide that both a refractive index and optical gain/loss are changed under the influence of an electric field or current. This characteristic is only found in some specific active layers or active waveguides. Specifically, the operation of a semiconductor active layer at a waveguide longer than its band gap wavelength (which is usually similar to the photoluminescence peak wavelength) means that the optical gain/loss characteristic cannot be substantially changed by an electric field because the material is essentially transparent to the operating wavelength.

Baba shows that a change in the refractive index occurs *without* changing the optical gain/loss at the operating wavelength. Specifically, the active layer clearly has a photoluminescence peak wavelength of 1.51 micrometers, whilst the operating wavelength specified in this citation is 1.575-1.580 micrometers. Thus, the operating wavelength is 55-60nm longer than the photoluminescence peak. Therefore, it would be physically impossible to achieve a substantial change in the optical gain/loss characteristics in such an apparatus when the operating wavelength is so much longer than the photoluminescence peak.

In order to further distinguish over Baba, the claims have been amended to specify that the semiconductor waveguide of the present invention is "active", and the gain/loss characteristics of the active waveguide portions are "optical". No new matter is entered.

In light of the above, it is clear that Baba does not anticipate the invention as claimed. Withdrawal of the outstanding anticipation rejection based on that reference is accordingly respectfully requested.

## **II. THE OBVIOUSNESS REJECTIONS**

Claims 24, 27 and 34 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Baba. In response, claims 24, 27 and 34 are each dependent on claim 21 which is neither anticipated nor rendered unpatentable by Baba for the above-discussed reasons. Withdrawal of the outstanding obviousness rejections is accordingly respectfully requested.

It is noted that the subject matter of claim 29 is allowable. In light of the arguments in amendments presented in this response, it is believed that all of the claims in the application are now in allowable condition. Early notice to that effect is respectfully requested.

## **III. NEW CLAIM**

New claim 36 is presented which is dependent on claim 21 and specifies that the input and output waveguides are passive waveguides. Support appears in the specification as originally filed, for example at page 10, beginning at line 3. No new matter is entered and no new issues are raised. It is therefore respectfully requested that new claim 36 be entered at this stage of prosecution and favorably considered along with the other claims in the case.

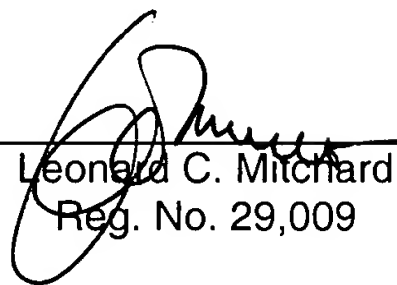
WHITE et al  
Appl. No. 09/937,718  
January 16, 2004

Allowance of the application is awaited.

Respectfully submitted,

**NIXON & VANDERHYTE P.C.**

By: \_\_\_\_\_

  
Leonard C. Mitchard  
Reg. No. 29,009

LCM:lfm  
1100 North Glebe Road, 8th Floor  
Arlington, VA 22201-4714  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100